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educts at both electrodes be collected. Such is the case when solutions of ammonia, muriatic acid, chlorides, iodides, acetates or other vegetable salts, etc., are employed.

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470. In a few cases, as where solutions of metallic salts liable to reduction at the negative electrode are acted upon, the oxygen may be advantageously used as the measuring substance. This is the case, for instance, with sulphate of copper.

471. There are therefore two general forms of the instrument which I submit as a measurer of electricity; one in which both the gases of the water decomposed are collected (444, 445, 446), and the other in which a single gas, as the hydrogen only, is used (442, 443). When referred to as a *comparative instrument* (a use I shall now make of it very extensively), it will not often require particular precaution in the observation; but when used as an *absolute measurer*, it will be needful that the barometric pressure and the temperature be taken into account, and that the graduation of the instruments should be to one scale; the hundredths and smaller divisions of a cubical inch are quite fit for this purpose, and the hundredth may be very conveniently taken as indicating a DEGREE of electricity.

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472. It can scarcely be needful to point out further than has been done how this instrument is to be used. It is to be introduced into the course of the electric current, the action of which is to be exerted anywhere else, and if 60° or 70° of electricity are to be measured out, either in one or several portions, the current, whether strong or weak, is to be continued until the gas in the tube occupies that number of divisions or hundredths of a cubical inch. Or if a quantity competent to produce a certain effect is to be measured, the effect is to be obtained, and then the indication read off. In exact experiments it is necessary to correct the volume of gas for changes in temperature and pressure, and especially for moisture.¹ For the latter object the volta-electrometer (fig. 26) is most accurate, as its gas can be measured over water, whilst the others retain it over acid or saline solutions.

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473. I have not hesitated to apply the *term* ^degree

(471), in analogy with the use made of it with respect to another most important imponderable agent, namely, heat; and as the definite expansion of air, water, mercury, etc., is there made use of to measure heat, so the equally definite evolution of gases is here turned to a similar use for electricity.

¹ For a simple table of correction for moisture, I may take the liberty of referring to my *Chemical Manipulation*, edition of 1830, p. 376.^j